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Management Recommendations for Ecological Restoration on the Little River Parcel

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Introduction

Successful ecological restoration requires past, present, and future monitoring in order to best understand ecological changes over time. Restorationists must gather strong baseline data, collect data throughout the restoration implementation, and conduct post-project monitoring as the site adjusts over time (Downs & Kondolf, 2002). Monitoring as a tool for land management can help landowners assess the current conditions of their property's ecosystem and plan for future potential issues caused by internal and external factors (Howell et al., 2012).

Coastal riparian areas are complex ecosystems with many physical and biological variables that affect the ecosystem's processes and productivity. Both tidal and riparian waters create niche habitats for unique plants, fish, amphibians, and birds, while simultaneously driving vital nutrient cycles (Flindt et al., 1999). The maintenance and management of coastal riparian areas is integral to a well-functioning surrounding ecosystem (Naiman et al., 2000). Due to the dynamic nature of coastal and watershed influences, coastal riparian habitats are often bombarded with non-native invasive plant species that are dispersed by water or wind (Bossard et al., 2000). Furthermore, development from humans has significantly impacted riparian areas by introducing invasive non-native plant species into waterways (Naiman et al., 2000). The California coastline and its many coastal rivers has been forever altered by rapid development over the past century (Handler et al., 2006). In particular, Humboldt County has experienced severe long-term impacts to virtually all the existing waterways due to heavy logging, conversion to agricultural land, and coastal development (Sawyer, 2006). These alterations have introduced non-native invasive species into sensitive coastal riparian areas, where they have outcompeted native vegetation, stabilized naturally shifting soils, and enabled conifer and alder encroachment onto grass-dominated flood plains (Alvarez & Cushman, 2002).

The Trinidad Coastal Land Trust (TCLT) in Trinidad, CA, owns and manages several properties where invasive plant species management is of key importance. The goals of this project were to gather sufficient data on the invasive species growing on the TCLT's Little River property parcel, note any important annual changes to the site, record observations of wildlife utilizing the property, document the presence of trash or unauthorized persons, and make land management recommendations to best meet the TCLT's goals in maintaining healthy and functional ecosystems.

Background

Trinidad Coastal Land Trust

The TCLT is a non-profit organization located in Trinidad, CA, whose mission is "dedicated to providing coastal access while protecting the natural beauty and character of the Humboldt County Coast from Little River to Big Lagoon" (TCLT, 2019). The TCLT currently manages 21 properties through fee-ownership and conservation easements, 14 of which provide public access to some of Humboldt County's most popular coastal treasures (Figure 1). In order to ensure the ecological integrity of the properties managed by the TCLT, yearly monitoring reports are conducted to note any changes to the properties and to inform future management decisions. The properties managed by the TCLT range from rocky coastal beaches with complex intertidal communities to second and old growth forests inland. Many of the properties owned and managed by the TCLT provide a variety of native plants and wildlife, including many rare or threatened plant species. These monitoring efforts ensure that unique ecosystems remain intact, and that any impacts to these sites can be addressed in a timely manner.

Figure 1: Map displaying all of Trinidad Coastal Land Trust's property holdings. Source: TCLT's website, https://www.trinidadcoastallandtrust.org/property-holdings-and-map.html

The Little River Parcel is one of the most valuable properties that the TCLT manages from an ecological point of view, due to the diversity of habitat present in a relatively undisturbed state. The 15-acre property is located, approximately three miles south of the town Trinidad, California (Figure 2). The parcel was acquired in 2005 by the TCLT with partial funding provided by grants from the California State Coastal Conservancy and the United States Fish and Wildlife Service (USFWS) in order to protect vital fish spawning habitats within the Little River watershed (TCLT, 2017). Although previously owned by various logging interests since 1875, the property was never developed and was only used as a riverine shipping corridor for logging operations upstream (TCLT, 2017). Upstream within the Little River watershed, property uses include mainly cattle grazing and timber harvest operations, and some small rural residential lands. Properties surrounding the TCLT's parcel include public and private holdings, including an easement corridor for U.S. State Highway 101.

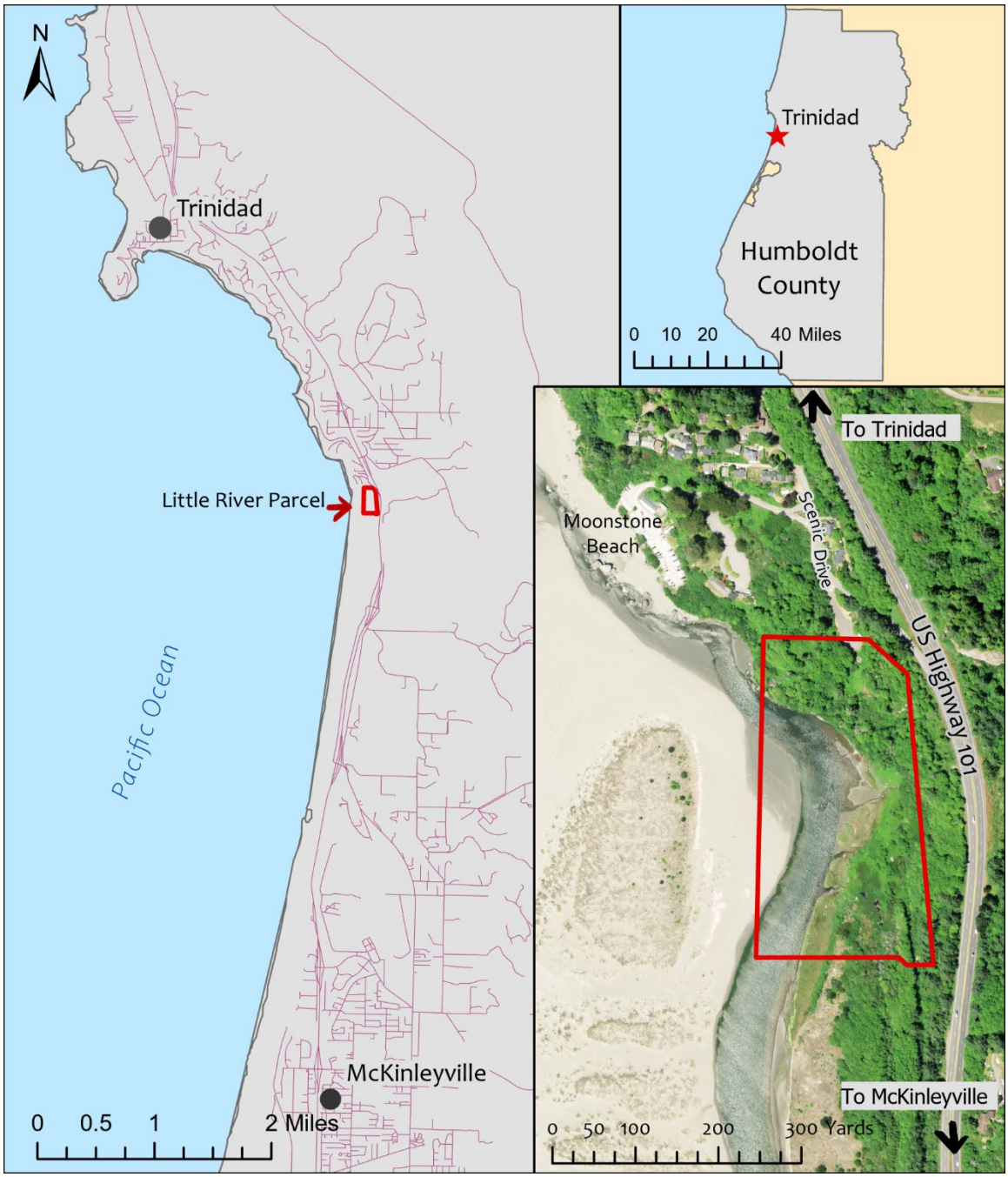

Figure 2: The Little River parcel is located in Humboldt County, CA, between the cities of Trinidad and McKinleyville. The northern boundary abuts the southern end of Scenic drive.

Environmental Setting

Geology/Soils

The greater Trinidad area consists of a geologic unit known as the Franciscan Complex. This parent material originated in the deep sea and is composed of accumulated marine sediments including sand, mud, gravel and the silica from the shells of marine creatures over tens of millions of years (Kilmer, 1975). This complex consists of sandstone, shale, conglomerate and chert. The soils found at the site are typic fluvaquents in the main floodplain which consists mostly of sands, gravels and consolidated silts, and thus is highly erodible. Other soils found at the site include Lepoil-Espa-Candymountain complex, Oxyaquic Udipsamments-Samoa complex, and Samoa-Clambeach complex (NRCS, 2019). The northern and eastern edges of the parcel include marine terrace material that contain greywacke, sandstone, Franciscan shale and chert. The geomorphology of the coast in this area is characterized by tectonic uplift and of multiple marine terraces (TCLT, 2017). Much like the rest of the California coast, the area is subject to frequent seismic activity due to its proximity to the Cascadia Subduction Zone. The Trinidad Fault runs through the northern portion of the parcel.

Vegetation

The topography of the Little River parcel consists of a riparian corridor along Little River to the west and a steeply graded and forested slope to the east (Figure 2). There is a large area of wetland in the eastern portion of the parcel that is hidden and difficult to access due to a thick grove of red alder (*Alnus rubra*) and Sitka spruce (*Picea sitchensis*). The western area of the parcel is riparian grassland that endures regular flooding from high tide and seasonal flood events and hosts numerous small perennial flow channels. The Little River channel is an active meandering stream, although its ability to meander is restricted to the east by a dense infestation

of European beach grass (*Ammophila arenaria*) (TCLT, 2017). Flora on the parcel include many native plants such as red alder, shore pine (*Pinus contorta*), Sitka spruce, salal (*Gaultheria shallon*), California huckleberry (*Vaccinium ovatum*), red currant (*Ribes sanguineum*), salmonberry (*Rubus spectabilis*), thimbleberry (*Rubus parviflorus*), California wax myrtle (*Morella californica*), coyote brush (*Baccharis pilularis* var. *pilularis*), coastal gumweed (*Grindelia stricta*), pickleweed (*Salicornia* sp.), and various native grasses and sedges. Non-native invasive species found on the parcel are English ivy (*Hedera helix*), cape ivy (*Delairea odorata*), Himalayan blackberry (*Rubus armeniacus*), jubata grass (*Cortaderia jubata*), European beach grass, yellow bush lupine (*Lupinus arboreus*), yellow vetch (*Lotus corniculatus*), and scotch broom (*Cytisus scoparius*) (TCLT, 2017).

Wildlife

Wildlife on the parcel includes a diverse array of birds and terrestrial animals both small and large (Table 1). Most notably, the Little River watershed includes important spawning habitat for anadromous and resident fish, including Chinook and Coho salmon, steelhead, and cutthroat trout (TCLT, 2017). An Aquatic Habitat Conservation Plan (AHCP) by USFWS found that Little River is "one of the best local salmonid streams, with healthy genetic stocks, sufficient returns to seed the system, and good salmonid habitat" (TCLT, 2017). Unfortunately, Little River is also currently listed as an impaired waterbody by the California North Coast Regional Water Quality Control Board due to excessive concentrations of bacteria (*Escherichia coli*), metals and metalloids, nutrients, pathogens, salinity, and other organics that are contributed to the watershed from other land uses upstream (TCLT, 2017). For this reason, it is the TCLT's top priority to improve the health of the Little River parcel in order to support a robust and healthy habitat for the multitude of wildlife and vegetation that rely upon it.

Table 1: Species list of birds, mammals, and fish recorded by Jim Webb at the TCLT Little River parcel. Source: Little River Baseline Report, TCLT, 2017.

Common Name	Species Name
Birds	
Willet	*Tringa semipalmata*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Snowy Egret	*Egretta thula*
Canada Goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Western Grebe	*Aechmophorus occidentalis*
Clark's Grebe	*Aechmophorus clarkii*
Pacific Wren	*Troglodytes pacificus*
Marsh Wren	*Cistothorus palustris*
Belted Kingfisher	*Megaceryle alcyon*
Bufflehead	*Bucephala albeola*
Common Merganser	*Mergus merganser*
Osprey	*Pandion haliaetus*
Mammals	
North American river otter	*Lontra canadensis*
Mountain beaver and other rodent species	*Aplodontia rufa, Rodentia*
Mink	*Mustelidae*
Squirrel	*Sciuridae*
Mule deer	*Odocoileus hemionus*
Black bear	*Ursus americanus*
Mountain lion	*Puma concolor*
Fish	
Chinook salmon	*Oncorhynchus tshawytscha*
Coho salmon	*Oncorhynchus kisutch*
Steelhead	*Oncorhynchus mykiss*
Cutthroat trout	*Oncorhynchus clarkii*

Little River Trail Construction

Construction of the Little River Trail is one of the TCLT's priority projects. This trail will connect the California Coastal Trail (Hammond Trail) to Trinidad, providing an uninterrupted trail system from the southern end of Eureka north to Trinidad. The trail is planned to be routed along the western side of Highway 101 through the Little River Parcel (see Appendix I for Proposed Little River Trail Map). The construction of the Little River Trail will be a combined effort of the TCLT, Caltrans, the Redwood Community Action Agency, and

numerous other local environmental groups. The construction of the trail will provide a unique opportunity to address management issues on the property that were previously unfeasible due to lack of access. As of September 2019, the TCLT secured $900,000 from the California State Coastal Conservancy to begin designing, planning, and conducting environmental impact reports for the construction of the Little River Trail (TCLT, 2019).

Methods and Findings

The Little River parcel was inspected on October 3, 2019, and photos, GPS points, and notes were taken to assess the current conditions of the property. A Garmin GPSMAP 64s handheld GPS unit was used in order to record the location and species of non-native invasive species present on the site. The resulting .gpx file was imported into ArcGIS Pro, then converted to shapefiles, which show the location and species to be treated. Due to difficult and unsafe access to accurately map the entire extent of the cape ivy (*Delairea odorata*) infestation, a polygon was digitized using NAIP imagery obtained from the USGS EarthExplorer website (USGS, 2019). The resulting map shows the extent and location of the invasive species that will be targeted in our restoration recommendations (Figure 3).

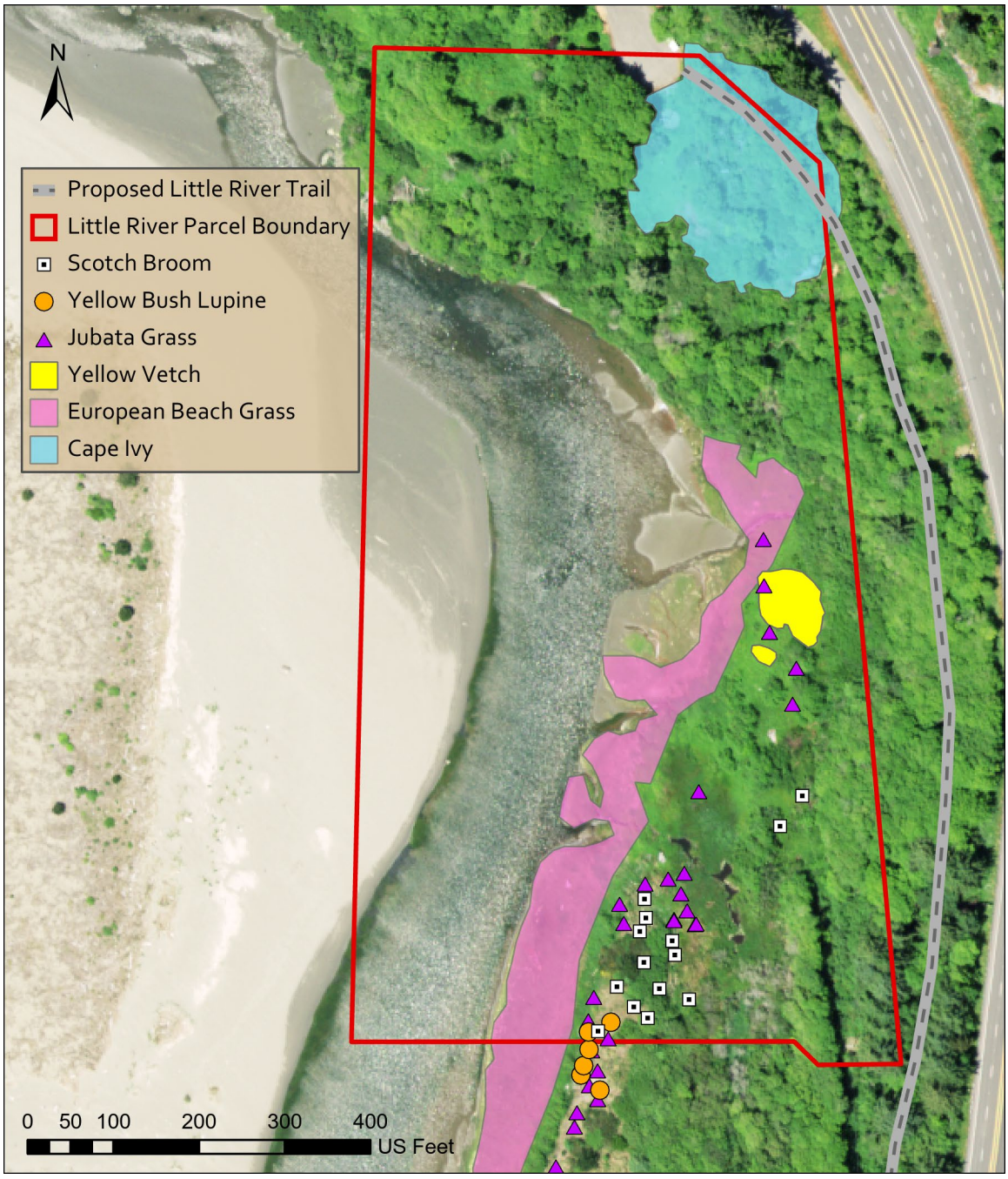

Figure 3: Map displaying the areas of invasive plant species on the TCLT Little River Parcel. Source of base layer: USGS NAIP.

After our visit to the Little River Parcel, we determined that the property is meeting the goals of the TCLT, despite the presence of several non-native invasive species. Our site visit to conduct the monitoring revealed some improvements to the property, such as a lack of trash and

lack of homeless camps that had been found on the property during the 2018 monitoring visit. The presence of the rock rip rap along the Highway 101 corridor was confirmed and found to be stable with no evidence of erosion or mass wasting events. The northern portion of the parcel hosted a very large swath of English and cape ivy (intermixed with Himalayan blackberry) that managed to reach to crown height in the nearby alders and Sitka spruce and crept down the hillslope towards the mouth of Little River. Similarly, the grassland portion along Little River was invaded by European beach grass, scotch broom, jubata grass, and a few shrubs of yellow bush lupine. There was a noted presence of young Sitka spruce saplings encroaching onto the grassland nearing the banks of Little River (Appendix II). Osprey, Belted Kingfisher, and various Gulls were seen feeding and hunting near the mouth of Little River during the site inspection conducted on October 3, 2019. Although the overall condition of the property is good, the continued presence and growing extent of invasive species poses a serious threat to the native vegetation and ecology of the parcel.

Management Recommendations

The Little River parcel has a rich and diverse array of ecosystems that can be enhanced with the right management techniques. Due to its proximity to the ocean and the highway, the area is prone to non-native plant invasions, stormwater runoff, and flooding (TCLT, 2017). While the issue of invasive plants can be actively managed, water quality issues due to stormwater runoff and upstream land practices are not manageable without a multi-landowever combined effort and a much larger ecological restoration plan for the entire Little River watershed.

Our recommendations for the Little River parcel are made with a few assumptions: (1) that the Little River Trail will be built and in the process, provide better access to remove invasive plants; (2) that the use of herbicides on the parcel will not be pursued in order to maintain ecological health and human health standards; and (3) that the TCLT is able to recruit volunteers for restoration efforts and/or hire technical experts to implement these plans. These assumptions are made in order to recommend realistic management plans for this property that would be feasible and cost-effective.

Invasive Plant Management

The removal of invasive plants on the Little River parcel should be considered a top priority for the property. Table 2 outlines the invasive species to be targeted and the methods for removal. The process and timeline of removing these plants will be highly dependent on the TCLT's ability to recruit volunteers or paid workers and work with neighboring land owners. All of the plants will require follow-up treatment and ongoing monitoring to detect and resprouts. It is possible that removal of invasive species at the site will take many years, so ongoing and adaptive management will be necessary.

Table 2: List of invasive plant species to be removed from the TCLT's Little River parcel, including the method and time frame for removal.

Species, Common Name; Priority	Reason for Removal	Method of Removal	Repeated Treatments
Ammophila arenaria, European beach grass; High	Stabilizes soils and prevents river meandering, creates monotypic stands that outcompete native vegetation (Bossard et al., 2000).	Cut rhizomes and dig up roots down to 2 feet (Crossman, 2018). Pile and burn the remains (Pickart, 1997).	Multiple treatments will need to be applied throughout the first year of removal, and taper off accordingly over the span of 5 years minimum (Pickart, 1997). The first year will require a minimum of three entries, with the second year requiring at least 2 entries (Crossman, 2018).
Hedera helix, English ivy; High	Aggressively invasive, decreases native species richness, strangles and kills native trees (Bossard et al., 2000).	Hand-pull small stems, cut larger stems with loppers or pruners. Dig up roots as much as possible. Ensure pulled plants are fully removed from the site, as piles left on site may re-root (Bossard et al., 2000).	Resprouting should be checked 3-4 times per year and sprouts removed by hand (Bossard et al., 2000).
Delairea odorata, cape ivy; High	Aggressively invasive, decreases native species richness, promotes growth of other non-native species (Alvarez & Cushman, 2002).	Hand-pull with attention paid to removing every part of stem to prevent resprouting. A Pulaski or McLeod may be needed to dig up stolons (Bossard et al., 2000).	Check the progress of the re-growth every six months and reassess removal needs. Annual removal is likely necessary, and replanting native species to prevent resprouting is recommended (Alvarez & Cushman, 2002). Monitoring should continue for 3-4 years following first removal (Bossard et al., 2000).
Rubus armeniacus, Himalayan blackberry; High	Highly competitive, can quickly crowd-out native plants, forms dense thickets (DiTomaso et al., 2013).	Hand-pull and cut above-ground vegetation and root mass with Pulaski or mattock (DiTomaso et al., 2013).	Removing the roots is crucial to eradication. Cutting should occur before flowering and treatment should be repeated biannually (DiTomaso et al., 2013).
Lupinus arboreus, yellow bush lupine; High	Disproportionately affects the environments it invades by fixing nitrogen into the soils that allows other species to invade (Pickart et al., 1998).	Hand-pull and cut; remove root with weed wrench or other hand tools if possible (Pickart et al., 1998).	Resprouting after cutting is uncommon, but monitoring and removal should be checked yearly (Pickart et al., 1998).
Cortaderia jubata, jubata grass; High	Limits water and nutrients to surrounding vegetation, spreads easily by seed and rhizomes, outcompetes native vegetation (Drewitz & DiTomaso, 2004).	Cut inflorescences off before removal to minimize seed dispersal. Pull or dig small plants with hand tools. Cut larger plants ensuring root mass is removed (Bossard et al., 2000).	Roots will resprout, so follow-up removal should be done biannually (Bossard et al., 2000).
Cytisus scoparius, scotch broom; Medium	Promotes growth of other weedy species through nitrogen fixation, has toxic seeds and leaves that can negatively affect wildlife, creates fire hazards, creates dense monotypic stands (Bossard et al., 2000).	Pull or dig small shrubs using hand tools, cut larger shrubs down to stump. Flame seedlings in follow up treatments with propane torch (Bossard et al., 2000).	Due to the long viability of seed, treatments are recommended annually for a minimum of 5 years. Cut stumps will resprout, requiring recutting every year. Seeds will sprout, and can be raked up and removed or flamed (Bossard et al., 2000).
Lotus corniculatus, bird's foot trefoil; Low	Forms dense mats and chokes out native vegetation (DiTomaso et al., 2013).	Hand-pull and cut, remove roots as much as possible (DiTomaso et al., 2013).	Monitor regrowth biannually following initial removal. Pull and cut as needed (DiTomaso et al., 2013).

The prioritization of the treatment of invasive species was determined by the following variables: the ability to effectively remove target species, the adverse effects of target species on native taxa, and the current extent of target species invasion (Bossard et al., 2000). *Ammophila areneria, Hedera helix,* and *Delairea odorata* were deemed the highest priority species for removal based on their current extent within the property. *Lupinus arboreus* was listed as a high priority species due to its disproportionate effect on the surrounding environment. The root system of *L. arboreus* contains nitrogen fixing nodules that alter the soil chemistry surrounding the plant, and allelopathic response makes it difficult for native plant species to compete for resources once *L. arboreus* has established itself in the community (Bossard et al., 2000). *Cytisus scoparius* poses a high threat due to its ability to create dense monotypic stands, its toxicity to wildlife, and its reproductive vigor (Bossard et al., 2000). The seeds may remain viable for years, even decades, making removal of the plant very difficult without the help of herbicide applications or continuous repeated treatments (Bossard et al., 2000). The species is normally considered a high-priority invasive species, but because it occurs fairly infrequently on the Little River property, it should be considered medium-priority.

The presence of *Ammophila arenaria* is perhaps the most concerning and pressing issue for the Little River property, due to its high ecological impact and difficulty of removal. The TCLT should prioritize its treatment above all other invasive species at the site. The grass spreads easily from nearby properties, so a joint effort with the California State Parks Service and private property owners is necessary to eradicate the grass from the Little River parcel. A project to remove the grass at Little River State Beach led by the State Parks Service in 2009 treated a 40-acre area of foredune (Forys, 2010). Monitoring and follow-up treatments have shown that the mechanical removal has been very successful in eradicating the grass and

reducing the likelihood of resprouting (Forys, 2010). Although mechanical removal is the most effective option, it is also the most expensive. However, if the TCLT can collaborate with the State Parks Service and nearby landowners, the cost will be more effective, and the impacts will be greatly increased in a shorter time frame. The benefits of a collaborative large-scale project will improve the natural ecology of the riparian, dune, and wetland areas of Little River. The construction of the Little River Trail will enable large machinery to access the beach grass areas that are currently only accessible by foot. Other options to remove the grass are manual removal or herbicide application. The use of herbicides should not be pursued due to the potential for the spray to kill other native plants and wildlife unintentionally, and the strong aversion to herbicide application in Humboldt County (Pickart, 1997). The "dig, pile, and burn" method is the best option for manual removal which involves using shovels to first sever the rhizomes, dig up the plants, pile the plants, and then burn the remains (Pickart, 1997). This requires a serious investment of time and money, and multiple follow up treatments will be necessary over the span of at least five years to ensure treatments are effective (Pickart, 1997).

Wildlife

The current species list of wildlife observed at this site (Table 1) seems to under-represent the full range of species that are likely utilizing the site. A more thorough bird survey will better inform future management decisions. Using acoustic sensors (i.e., voice recorders) would provide a cost-effective way to determine bird species richness (Wimmer et.al., 2013). We propose deploying field recorders in order to get an accurate sample of bird species that are utilizing the site. An abstract design would involve deploying bird recorders at the northern and southern portions of the property. A modern voice lecture recording device would be programmed to record for a half hour at dawn and dusk over a two-week period. We suggest

collecting recordings during the fall and winter migration periods, as well as a sample during the summer and winter months, in order to identify resident species populations. These recordings will then have to be contracted out to a qualified ornithologist/consulting agency for accurate species identification.

To gather more information on what terrestrial animals are present on the parcel, we recommend setting up several game cameras with motion sensors. At least two cameras should be placed on the property, both with as wide a view as possible. Since a large portion of the parcel is heavily wooded, the locations should be selected based on width of view and proximity to freshwater and food sources on the property. The cameras should be checked monthly and kept on file at the TCLT office. Obtaining data on what species are utilizing the parcel and how often will help inform land management decisions that may affect terrestrial wildlife.

The presence of Coho salmon and other endangered or threatened fish in the Little River watershed is necessary to consider for the management of the TCLT's parcel. The National Oceanic and Atmospheric Administration's Coho Salmon Recovery Plan analyzed the status of Coho salmon in Little River and found that the population in Little River is at "moderate risk of extinction" due to population decline (NOAA, 2014). The Recovery Plan for Little River cites that runoff from roads, agricultural practices, and a lack of floodplain and channel structure are the top threats to the Coho population (NOAA, 2014). The mouth and estuary of Little River contains only a few off-channel and backwater habitats occurring in the estuary, which are vital habitats for juvenile and smolting salmon (NOAA, 2014). The conversion of estuarine and wetland lands to agricultural lands has deprived salmon populations with the necessary habitat conditions to thrive (Lohse et al., 2008). Furthermore, there is little to no "livestock exclusion" from the river in the upstream watershed and animals are free to trample and overgraze the

streambanks (NOAA, 2014). These issues extend much farther into the Little River watershed, and cannot be addressed by the TCLT without a combined effort from public and private landowners to reduce impacts to Little River. For this reason, we recommend that the TCLT conduct water quality testing annually to ensure that the condition of Little River is not worsening.

Public Access and the Little River Trail

Funding for the first phase of the Little River Trail project was secured in September, 2019, allowing the TCLT to begin planning and conducting environmental impact analyses of the trail's construction (Table 3). The preferred alignment of the trail extends along the western side of the Little River Bridge aside U.S. Highway 101 and runs along the eastern portion of the TCLT's parcel, ending at the Scenic Drive cul-de-sac (Appendix II) (TCLT, 2019). The trail will enhance public access and provide benefits such as education, scenic views, environmental conservation, and recreation at Little River. The trail represents a unique opportunity for the TCLT to access areas of the property for invasive plant removal that are currently inaccessible. The TCLT could implement many of the invasive plant removal recommendations during trail construction, and continue monitoring the progress well after the trail is completed.

Table 3: A rough timeline for the construction of the Little River Trail (TCLT, 2019).

2019	2020	2021	2022	2023+
$900,000 Grant awarded For pre-project planning & permitting	Grant application for construction costs	Begin construction if funding is acquired	Completion of Little River trail; begin implementation of restoration plan	Post-project monitoring to ensure restoration goals are met and to inform adaptive management plan

The completion of the trail may present new issues for the Little River property: trash. There will need to be sufficient waste bins located along the trail for people to properly dispose of their garbage. With the improved access to the Little River parcel, there is also the potential for homeless people to establish camps within the parcel, which will create a significant source of litter. The TCLT will need to monitor the trail area more frequently than the current annual monitoring schedule. We recommend establishing a less intensive monthly monitoring protocol specifically for this task, to be completed by TCLT volunteers throughout the year.

Conclusion

Ecological restoration as a method of land management helps bring the ecosystem back to equilibrium, reconnects complex ecological dynamics, and restores species habitat while promoting diversity. Highly productive ecosystems such as coastal riparian habitats have been severely impacted and damaged by human activities. The construction of the Little River Trail provides a unique opportunity for the Trinidad Coastal Land Trust to access and implement restoration treatments to this ecologically important property. With the ability to access the parcel by foot, it will be possible to host volunteer days at the property and further facilitate future monitoring efforts. The management recommendations laid out in this document will help to create a more resilient species composition and further improve the habitat value at the Little River parcel. The Little River Estuary is highly regarded as vital spawning habitat for anadromous fish species, foraging habitat for bird species, and critical habitat for native plant species. Continued land stewardship both upstream and on site are vital to sustaining and improving the ecological integrity of the estuary as a whole.

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Appendix I: Proposed Little River Trail Map

Source: TCLT Website, 2019.

TRINIDAD COASTAL LAND TRUST
P.O. Box 457, Trinidad, CA 95570
www.TrinidadCoastalLandTrust.org

CONSERVATION PROPERTY MONITORING REPORT

Property name: Little River

Dates of visits: October 3, 2019
Date of report: October 7, 2019
Name(s) of monitor(s) and relationship w/ TCLT: Maya Partain, Garitt Mathews (HSU Capstone Ecological Restoration student volunteers)
Last monitoring date: November 18, 2018
Weather at time of visit: Sunny and warm (~68-70 degrees F)

I. PRE-FIELD NOTES

1) Is notification of any person required? No
If so, was the person notified? N/A
In writing? N/A

2) Have there been any management plan changes or improvements related to the property in the past year? No. If yes, please describe: No management plan has been adopted for this property.

3) Have there been any significant changes in use of the property (occupancy, boundary adjustments, adjacent landowner actions affecting the property) in the past year? No. The property is unimproved, vacant land.

4) What significant issues need to be evaluated in an inspection (from Property Report folder, baseline data, maps, and previous monitoring reports)?

a. Inspect for intrusions into the property by unauthorized persons, including disposal of garbage and homeless occupancy.
b. Rock rip rap placed along the toe of the slope along the east side of the Little River floodplain. There is no recorded authorization for this construction, which appears to have been installed to protect the engineering integrity of U.S. Highway 101.

c. Presence and prevalence of non-native invasive plant species throughout the parcel.

II. FIELD OBSERVATIONS

1) Describe all significant observations about the use and management of the property (conditions of trails and other improvements, natural disturbances, weed infestations, and other observations).

a. Monitoring flagged plots on the northeastern portion of the property remain (refer to 2018 monitoring report). It is unclear whether these plots are authorized or are even within the property boundaries (they may be located on the Caltrans Right of Way). They have been overgrown with cape ivy.
b. There was no evidence of any homeless encampments within or surrounding the property boundaries. The area where a camp was found last year was vacant and free of any litter.
c. A massive infestation of exotic ivy (English ivy, *Hedera helix*, and cape ivy, *Delairea odorata*) is present along the steep hillslope below the cul-de-sac at the end of Scenic Drive in the northeastern portion of the property. Himalayan blackberry (*Rubus armeniacus*) is intermixed with the ivy. Other non-native invasions are present along the floodplain of Little River, including jubata grass (*Cortaderia jubata*), yellow bush lupine (*Lupinus arboreu*s), scotch broom (*Cytisus scoparius*), yellow vetch (unknown species), and European beach grass (*Ammophila arenaria*). There is also evidence of conifer encroachment onto the wetland area that has been stabilized by *A. arenaria*.
d. Several culverts provide drainage for streams passing under U. S. Highway 101 on the east side of the parcel. There is no recorded authorization for these improvements, but they may have been installed by a prior landowner to control erosion on the steep face of the marine terrace at this location. The accessible culvert on the northeastern portion of the parcel near the Scenic Drive cul-de-sac has failed.
e. The presence of rock rip rap at the toe of the slope along Highway 101 was confirmed and examined. The rip rap appears to be stable at this time, and there was no evidence of any mass wasting events.
f. There was a *Grindelia stricta* individual observed growing among the grasses on the flood plain, which had not been previously observed or noted in the Baseline Report or the Monitoring Reports.
g. There were visual observations of both Osprey, Belted Kingfisher, and various Gull species on the property, apparently using Little River for feeding grounds. There was a possible nesting location of Osprey along the northeastern border of the property, but the area may have been located on the Caltrans Right of Way.

2) Based on review of past monitoring report(s), look for evidence of whether past violations noted in the report(s) still exist or have been rectified. Report your observations of the current status.

The only ongoing past issues identified during this year's monitoring have been the continued invasion of non-native plants on both the northeastern part of the parcel and along the eastern edge of Little River. The homeless camp found during last year's monitoring has been vacated and no remnants of the camp remain at the site.

III. COMPLIANCE WITH MANAGEMENT PLAN: Is the current condition of the property consistent with the TCLT management plan for the property? Report observed uses of the property that may conflict with uses authorized in the Plan:

No management plan is currently adopted for this property. Other than pervasive weed infestations, the property is in good condition and meets the goals of the acquisition.

IV. MANAGEMENT RECOMMENDATIONS: List land management recommendations or general recommendations and comments to consider for the property.

a. Aggressive removal of invasive plants on the property should be prioritized.
    i. A joint effort between the California State Parks Service at Little River State Beach and TCLT will be necessary to realistically remove and combat the infiltration of European beach grass (*Ammophila arenaria*).
    ii. The construction of the Little River Trail is necessary to provide access to the large areas of ivy near the Scenic Drive cul-de-sac.
    iii. Removal of the invasive plants along the flood plain should be pursued first with volunteer work days, and supplemented with contract hiring if necessary.
    iv. Ongoing monitoring and treatment of certain species may be necessary, especially in the case of European beach grass.
b. Perform an annual water quality test of the Little River to determine turbidity, dissolved oxygen, pH, and temperature. Water quality tests may help determine issues in the river and guide management practices to ensure healthy waters for aquatic life.
c. See Appendix for

V. POST-REQUIREMENTS

Finalize Monitoring Report including photo log. If necessary, written notice of any violation and required corrective action must be given to the responsible party, if known. Place copy of complete monitoring form in Property binder.

VI. PHOTOGRAPH RECORD

Include a Map of Property showing the location of all photographs. Describe the location of photo/ observance, document activities re: rights and restrictions on map, text and with photographs.

Little River Monitoring 2019 Photo Log

Date: October 3, 2019
Photographer: Garitt Mathews

Photo #	Location Description	Photo Subject Description	GPS Coordinates	Compass Bearing
1	Northeast section of parcel at end of Scenic Drive	Extensive invasion of cape ivy and Himalayan blackberry covering the area at the end of Scenic Drive cul-de-sac	124.1084878°W 41.0283351°N	SE
2	Northeast section of parcel at end of Scenic Drive	Cape ivy invasion looking downhill from the power line pole	124.1086204°W 41.0280346°N	S
3	Northeast section of parcel at end of Scenic Drive	Cape ivy invasion in gully along the W edge of the parcel	124.1087712°W 41.0281012°N	N-NW
4	Northeast section of parcel at end of Scenic Drive	Large rounds of coast redwood apparently dumped on the site at the end of the Scenic Drive cul-de-sac	124.1086184°W 41.0282704°N	S
5	Northeast section of parcel at end of Scenic Drive	Cape ivy invasion growing up into fir trees next to the highway, almost reaching crown height	124.1081435°W 41.0281525°N	E
6	Northeast section of parcel at end of Scenic Drive	Failed culvert where water appears to have blown out the top of the culvert	124.1079123°W 41.0279281°N	n/a
7	Northeast section of parcel at end of Scenic Drive	Small amounts of trash, possibly kleenex or toilet paper with unknown substance on it	124.1079423°W 41.0279323°N	n/a
8	Northeast section of parcel at end of Scenic Drive	Location of homeless camp previously occupied in recent years, now empty and free of trash	124.1083153°W 41.0280466°N	S
9	Southern boundary of parcel	Small but healthy population of pickleweed and tufted hair grass	124.1091640°W 41.0238774°N	n/a
10	Southern portion of parcel	Showing extent of *Ammophila arenaria* invading upon native grasses, pickleweed shown in lower right corner	124.1091942°W 41.0251845°N	S
11	Southern boundary of parcel	Jubata grass and yellow bush lupine invading and encroaching closer to riverbanks	124.1089774°W 41.0254916°N	E
12	Central portion of parcel	Small creek at the N section of parcel, showing clear division between native and invasive grasses on either side of channel	124.1090637°W 41.0252480°N	N
13	South-central portion of parcel	Seagulls apparently feeding, near the opening of the slough channel where slough meets Moonstone Beach	124.1082121°W 41.0267588°N	W

14	South-central portion of parcel	Old cut stumps, likely cut by PG&E or Caltrans to free up access to the power lines overhead	124.1082646°W 41.0264801°N	E
15	Southeastern portion of parcel	Small cattail population along narrow stream channel	124.1081165°W 41.0263338°N	S-SE
16	South of parcel boundary	Scotch broom and Jubata grass intermixed (technically outside of parcel boundaries, but representative of difficult-to-access areas within boundaries)	124.1083321°W 41.0256847°N	n/a
17-18	South of parcel boundary	*Grindelia stricta* individual growing amongst native grasses	124.1090561°W 41.0249587°N	n/a

Figure 1. Little River monitoring photo map 2019. Source: Earth Explorer.

Photo #1: Extensive invasion of cape ivy and Himalayan blackberry covering the area at the end of Scenic Dr. cul-de-sac.

Photo #2: Cape ivy invasion looking downhill from the power line pole.

Photo #3: Cape ivy invasion in gully along the W edge of the parcel.

Photo #4: Large rounds of coast redwood apparently dumped on the site at the end of the Scenic Drive cul-de-sac.

Photo #5: Cape ivy invasion growing up into fir trees next to the highway, almost reaching crown height.

Photo # 6: Failed culvert where water appears to have blown out the top of the culvert.

Photo #7: Small amounts of trash, possibly toilet paper with unknown substance on it.

Photo #8: Location of homeless camp previously occupied in recent years, now empty and free of trash.

Photo #9: Small but healthy population of pickleweed and tufted hair grass.

Photo #10: Showing extent of *Ammophila arenaria* invading upon native grasses, pickleweed shown in lower right corner.

Photo #11: Jubata grass and yellow bush lupine invading and encroaching closer to riverbanks.

Photo #12: Small creek at the N section of parcel, showing clear division between native and invasive grasses on either side of channel.

Photo #13: Seagulls apparently feeding, near the opening of the slough channel where slough meets Moonstone Beach.

Photo #14: Old cut stumps, likely cut by PG&E or Caltrans to free up access to the power lines overhead.

Photo #15: Small cattail population along narrow stream channel.

Photo #16: Scotch broom and Jubata grass intermixed (technically outside of parcel boundaries, but representative of difficult-to-access areas within boundaries).

Photo #17: *Grindelia stricta* individual growing amongst native grasses.

Photo #18: *Grindelia stricta's* distinct involucre.